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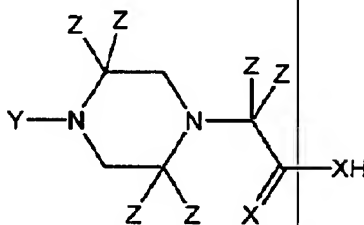
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C. In the Claims:

Please amend the claims as follows. The following listing of claims will replace all prior listings and versions of the claims in this application.

1. (Currently Amended) An isotopically enriched N-substituted piperazine acetic acid compound of the formula:



~~or a salt thereof, comprising one or more heavy atom isotopes, wherein;~~

X is O or S;

Y is a straight chain or branched C1-C6 alkyl group or a straight chain or branched C1-C6 alkyl ether group wherein the carbon atoms of the alkyl group or alkyl ether group each independently ~~comprise~~ are optionally substituted with linked hydrogen, deuterium or fluorine atoms;

each Z is independently hydrogen, deuterium, fluorine, chlorine, bromine, iodine, an amino acid side chain, a straight chain or branched C1-C6 alkyl group that may optionally contain a substituted or unsubstituted aryl group wherein the carbon atoms of the alkyl and aryl groups each independently ~~comprise~~ are optionally substituted with linked hydrogen, deuterium or fluorine atoms, a straight chain or branched C1-C6 alkyl ether group that may optionally contain a substituted or unsubstituted aryl group wherein the carbon atoms of the alkyl and aryl groups each independently ~~comprise~~ are optionally substituted with linked hydrogen, deuterium or fluorine atoms or a straight chain or branched C1-C6 alkoxy group that may optionally contain a substituted or unsubstituted aryl group wherein the carbon atoms of the alkyl ~~alkoxy~~ and aryl groups each independently ~~comprise~~ are optionally substituted with linked hydrogen, deuterium or fluorine atoms.

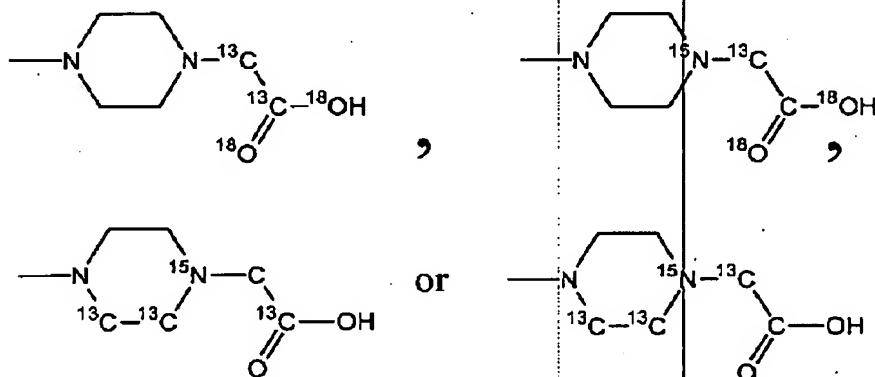
2. (Original) The compound of claim 1, wherein the N-substituted piperazine acetic acid is isotopically enriched with two or more heavy atom isotopes.

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Y is a straight chain or branched C1-C6 alkyl group or a straight chain or branched C1-C6 alkyl ether group wherein the carbon atoms of the alkyl group or alkyl ether group each independently comprise are optionally substituted with linked hydrogen, deuterium or fluorine atoms;

each Z is independently hydrogen, deuterium, fluorine, chlorine, bromine, iodine, an amino acid side chain, a straight chain or branched C1-C6 alkyl group that may optionally contain a substituted or unsubstituted aryl group wherein the carbon atoms of the alkyl and aryl groups each independently comprise are optionally substituted with linked hydrogen, deuterium or fluorine atoms, a straight chain or branched C1-C6 alkyl ether group that may optionally contain a substituted or unsubstituted aryl group wherein the carbon atoms of the alkyl and aryl groups each independently comprise are optionally substituted with linked hydrogen, deuterium or fluorine atoms or a straight chain or branched C1-C6 alkoxy group that may optionally contain a substituted or unsubstituted aryl group wherein the carbon atoms of the alkyl and aryl groups each independently comprise are optionally substituted with linked hydrogen, deuterium or fluorine atoms.

12. (Currently Amended) The compound of claim 1 of the formula:

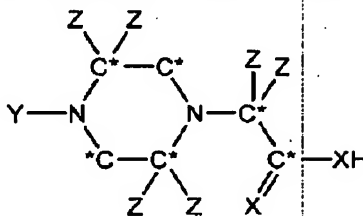


or a salt thereof.

13. (Original) The compound of claim 12, wherein the compound is a zwitterion, mono-TFA salt, a mono-HCl salt, a bis-TFA salt or a bis-HCl salt.

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3. (Original) The compound of claim 1, wherein the N-substituted piperazine acetic acid is isotopically enriched with three or more heavy atom isotopes.
4. (Original) The compound of claim 1, wherein the N-substituted piperazine acetic acid is isotopically enriched with four or more heavy atom isotopes.
5. (Currently Amended) The compound of claim 42, wherein the heavy atom isotopes are each independently ^{18}O , ^{15}N or ^{13}C , but not deuterium.
6. (Original) The compound of claim 1, wherein each Z is independently hydrogen, fluorine, chlorine, bromine or iodine.
7. (Original) The compound of claim 1, wherein each Z is independently hydrogen, methyl or methoxy.
8. (Original) The compound of claim 1, wherein Y is methyl, ethyl, *n*-propyl, isopropyl, *n*-butyl, isobutyl, *sec*-butyl or *tert*-butyl.
9. (Original) The compound of claim 1, wherein X is ^{16}O or ^{18}O .
10. (Original) The compound of claim 1, wherein each nitrogen atom of the piperazine ring is independently ^{14}N or ^{15}N .
11. (Currently Amended) The compound of claim 1 of the formula:



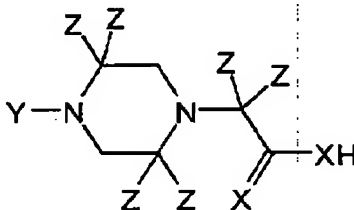
wherein,

each C* is independently ^{12}C or ^{13}C ;

X is O or S;

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14. (Original) The compound of claim 12, wherein each incorporated heavy atom isotope is present in at least 80 percent isotopic purity.
15. (Original) The compound of claim 12, wherein each incorporated heavy atom isotope is present in at least 93 percent isotopic purity.
16. (Original) The compound of claim 12, wherein each incorporated heavy atom isotope is present in at least 96 percent isotopic purity.
17. (Original) The compound of claim 1, wherein the N-substituted piperazine acetic acid is a mono-TFA salt, a mono-HCl salt, a bis-HCl salt or a bis-TFA salt.
18. (Original) The compound of claim 1, wherein each incorporated heavy atom isotope is present in at least 80 percent isotopic purity.
19. (Original) The compound of claim 1, wherein each incorporated heavy atom isotope is present in at least 93 percent isotopic purity.
20. (Original) The compound of claim 1, wherein each incorporated heavy atom isotope is present in at least 96 percent isotopic purity.
21. (Original) The compound of claim 12, wherein the compound is a carboxylate anion.
22. (Original) The compound of claim 1, wherein the compound is a carboxylate anion.
23. (New) An isotopically enriched N-substituted piperazine acetic acid compound of the formula:



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or a salt thereof, wherein;

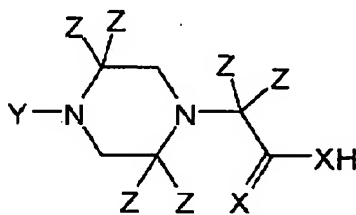
each X is O or S;

Y is a straight chain or branched C1-C6 alkyl group or a straight chain or branched C1-C6 alkyl ether group wherein the carbon atoms of the alkyl group or alkyl ether group each independently are optionally substituted with linked deuterium or fluorine atoms; and

each Z is independently hydrogen, fluorine, chlorine, bromine, iodine, an amino acid side chain or a straight chain or branched C1-C6 alkyl group that may optionally contain a substituted or unsubstituted aryl group wherein the carbon atoms of the alkyl and aryl groups each independently are optionally substituted with linked fluorine atoms;

wherein the N-substituted piperazine acetic acid is isotopically enriched with one or more ^{13}C atoms and/or ^{15}N atoms.

24. (New) The compound of claim 23, wherein Y is a straight chain or branched C1-C6 alkyl group and each Z is independently hydrogen, fluorine, chlorine, bromine, iodine, an amino acid side chain or a straight chain or branched C1-C6 alkyl group.
25. (New) An isotopically enriched N-substituted piperazine acetic acid compound of the formula:



, or a salt thereof, wherein;

X is O or S;

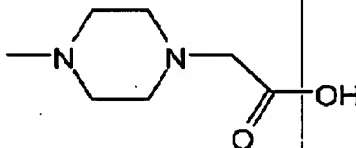
Y is a straight chain or branched C1-C6 alkyl group or a straight chain or branched C1-C6 alkyl ether group; and

each Z is independently hydrogen, fluorine, chlorine, bromine, iodine, an amino acid side chain or a straight chain or branched C1-C6 alkyl group; and

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wherein the N-substituted piperazine acetic acid is isotopically enriched with one or more ^{13}C atoms, ^{15}N atoms and/or ^{18}O atoms.

26. (New) An isotopically enriched N-substituted piperazine acetic acid compound of the formula:



or a salt thereof, wherein the N-substituted piperazine is isotopically enriched with one or more ^{13}C atoms, ^{15}N atoms and/or ^{18}O atoms.